In the Claims:

1. (Currently Amended) A method for oxidizing a layer~~(36)~~, comprising the following steps, carried out without restriction in the order indicated:

providing a substrate~~(14)~~, which bears a layer~~(36)~~ which is to be oxidized, the layer~~(36)~~ which is to be oxidized being part of a layer stack ~~(16)~~ which includes the substrate~~(14)~~ or a base layer ~~(32)~~ at a base surface of the layer~~(36)~~ which is to be oxidized, and a neighboring layer ~~(34)~~ which adjoins ~~that~~ a surface of the layer~~(36)~~ to be oxidized which is remote from the base surface, and the layer~~(36)~~ which is to be oxidized being uncovered in an edge region of the layer stack~~(16),~~;

introducing the substrate~~(14)~~ which bears the layer stack~~(16)~~ into a heating device~~(80),~~;

passing an oxidation gas onto the substrate~~(36),~~;

heating the substrate~~(36)~~ to a process temperature, the layer ~~(36)~~ which is to be oxidized, as the oxidation time continues, being oxidized ever further from ~~its~~ an edge into the layer stack~~(16)~~ under the influence of the oxidation gas at the process temperature~~,~~;

recording the process temperature during the processing via ~~the~~ a temperature of a holding device~~(110)~~ which holds the substrate~~(14),~~;

and controlling ~~(152)~~ the temperature of the substrate~~(14)~~ to a predetermined desired temperature or a predetermined desired temperature curve during the processing.

2. (Currently Amended) The method as claimed in claim 1, wherein at least one of:

a main surface of the substrate ~~(14) bears parallel against~~ contacts a main surface of the holding device~~(110)~~ or is arranged at a distance of less than three millimeters ~~or less than one millimeter or less than 0.5 millimeter~~from the main surface of the holding device,

~~and/or wherein~~a 10°C deviation in the process temperature causes ~~the~~ an oxidation width ~~(W)~~ to deviate by more than 5%~~or by more than 10% or by more than 20% from a desired oxidation width~~,

~~and/or wherein~~ the layer ~~(36)~~ which is to be oxidized contains a semiconductor material~~, preferably gallium arsenide,~~ which is doped with a metal, ~~preferably with aluminum,~~

~~and/or wherein~~ the substrate ~~(14)~~ contains gallium arsenide,

~~and/or wherein~~ the layer ~~(36)~~ which is to be oxidized is arranged between two layers ~~(32, 34)~~ which are not to be oxidized during the processing, ~~preferably between two layers (32, 34) which contain gallium arsenide,~~

~~and/or wherein~~ the process temperature is between 100°C and 500°C,

~~and/or~~ in which the oxidation width ~~(W)~~ is ~~decisively~~ dependent on the process temperature,

and/~~or~~ in which the substrate ~~(14)~~ is processed in a single-substrate process in the heating device ~~(80)~~.

3. (Currently Amended) The method as claimed in claim 1 ~~or 2~~, wherein ~~the~~ at least one of:

a thermal conductivity of the holding device ~~(110)~~ at 20°C is greater than 10 $Wm^{-1}K^{-1}$, ~~preferably greater than 100 $Wm^{-1}K^{-1}$,~~

~~and/or wherein~~ the thermal conductivity of the holding device at the process temperature is greater than ~~the~~ a thermal conductivity of the substrate ~~(14)~~ at the process temperature,

~~and/or wherein~~and the holding device ~~(110)~~ contains graphite~~, preferably coated graphite~~.

4. (Currently Amended) The method as claimed in ~~one of the preceding claims~~claim 1, wherein a heat-up time of the heating device ~~(80)~~ from ~~the~~ a start ~~(t0)~~ of ~~the~~ a heating operation until the process temperature is reached is less than five minutes, the process temperature ~~preferably being~~is between 350°C and 450°C, and at least one of:

a temperature of less than 50°C ~~prevailing~~ prevails in the heating device ~~(80)~~ at the start ~~(t0, t0a)~~ of the heating operation,

~~and/or wherein the~~ and a residence time of the substrate ~~(14)~~ in the heating device ~~(80)~~ is less than fifteen minutes ~~or less than 10 minutes~~.

5. (Currently Amended) The method as claimed in ~~one of the preceding claims~~claim 1, wherein during the heating of the substrate ~~(14)~~ to the process temperature at least one preheating step ~~(t1a)~~ is carried out, in which the temperature in the heating device ~~(80)~~ is held at a preheating temperature, which is lower than the process temperature and higher than a condensation temperature of the oxidation gas or a gas which has been admixed with the oxidation gas, for at least ten seconds ~~or least thirty seconds~~,

and wherein the oxidation gas starts to be admitted to the heating device ~~(80)~~ before the preheating temperature is reached or at the preheating temperature.

6. (Currently Amended) The method as claimed in ~~one of the preceding claims~~claim 1, wherein at least one of: the holding device ~~(110)~~ is covered by a cover ~~(116), and/or wherein~~and the cover ~~(116)~~ rests on an edge ~~(122)~~ of the holding device ~~(110)~~ or is held at a predetermined distance from the edge ~~(122)~~.

7. (Currently Amended) The method as claimed in ~~one of the preceding claims~~claim 1, wherein the substrate ~~(14)~~ has a circular base surface, and ~~wherein~~ at least one of:

the holding device ~~(110)~~, in ~~the~~ a circumferential direction of the substrate ~~(14)~~, has a recess ~~(130)~~ into which a ~~preferably exchangeable~~ ring ~~(128) made from a material which is preferably different than the material of the holding device (110)~~ is placed,

~~and/or wherein~~and the heating device ~~(80)~~ includes straight heating elements ~~(86 to 104)~~ or spot-like heating elements.

8. (Currently Amended) The method as claimed in ~~one of the preceding claims~~claim 1, wherein the heating device ~~(80) is suitable for~~ can achieve heating rates of greater than 8°C per second,

wherein the layer stack ~~(16)~~ includes a layer ~~(46)~~ whose edge projects beyond the stack ~~(16)~~, ~~preferably a contact-making layer, the contact-making layer preferably containing gold,~~

and wherein the heating-up to process temperature is carried out at a heating rate of less than 6°C per second~~ or less than 3°C per second~~.

9. (Currently Amended) The method as claimed in claim 1~~one of the preceding claims~~, wherein the oxidation is interrupted~~ (202)~~ before a desired oxidation width ~~(W)~~ is reached,

wherein the oxidation width~~ (W1)~~ is recorded,

and wherein a post-oxidation of the layer which is to be oxidized is carried out ~~(206)~~ as a function of the recorded oxidation width~~ (W1)~~.

10. (Currently Amended) The method as claimed in claim 1~~one of the preceding claims~~, wherein the oxidation gas contains oxygen in a form bonded to at least one other element, ~~preferably bonded in H_2O molecules,~~

and wherein the level of molecular oxygen during processing is less than 1%.

11. (Currently Amended) The method as claimed in claim 1~~one of the preceding claims~~, wherein the temperature of the holding device is recorded using a pyrometer ~~(134)~~ or using at least one thermocouple~~ (154)~~.

12. (Currently Amended) The ~~use of the~~ method as claimed in claim 1,~~one of the preceding claims for fabricating~~ in which the oxidized layer is used in an electronic component~~ (10)~~ with electrical contacts~~ (46)~~, and at least one of:

~~the~~ a contact resistance of the electrical contacts~~ (46)~~ being less than 5 times 10^{-6} Ω/cm^{-2}~~ or less than 4 times 10^{-6} Ω/cm^{-2},~~ or ~~the contact resistance~~ being lower than the contact resistance which is produced in a conventional furnace process using otherwise identical materials,

~~and/or for producing~~ and the electronic component is an integrated vertical laser unit~~ (10)~~.

13. (Currently Amended) A holding device~~ (110), in particular for carrying out the method as claimed in one of the preceding claims,~~ containing a layer to be oxidized by the following steps, carried out without restriction in the order indicated: providing a substrate, which bears a layer which is to be oxidized, the layer which is to be oxidized being part of a layer stack which

includes the substrate or a base layer at a base surface of the layer which is to be oxidized, and a neighboring layer which adjoins a surface of the layer to be oxidized which is remote from the base surface, and the layer which is to be oxidized being uncovered in an edge region of the layer stack; introducing the substrate which bears the layer stack into a heating device; passing an oxidation gas onto the substrate; heating the substrate to a process temperature, the layer which is to be oxidized, as the oxidation time continues, being oxidized ever further from an edge into the layer stack under the influence of the oxidation gas at the process temperature; recording the process temperature during the processing via a temperature of the holding device which holds the substrate; and controlling the temperature of the substrate to a predetermined desired temperature or a predetermined desired temperature curve during the processing, the holding device:

having a flat base body which contains graphite,

and having a recess ~~(124)~~ which is matched to a substrate ~~(114)~~,

~~which holding device~~and includes an outer coating.

14. (Currently Amended) The holding device ~~(110)~~ as claimed in claim 13, wherein the coating contains graphite ~~which has preferably been applied using a CVD process~~.

15. (Currently Amended) A holding device ~~(110), in particular for carrying out the method as claimed in one of claims 1 to 12~~containing a layer to be oxidized by the following steps, carried out without restriction in the order indicated: providing a substrate, which bears a layer which is to be oxidized, the layer which is to be oxidized being part of a layer stack which includes the substrate or a base layer at a base surface of the layer which is to be oxidized, and a neighboring layer which adjoins a surface of the layer to be oxidized which is remote from the base surface, and the layer which is to be oxidized being uncovered in an edge region of the layer stack; introducing the substrate which bears the layer stack into a heating device; passing an oxidation gas onto the substrate; heating the substrate to a process temperature, the layer which is to be oxidized, as the oxidation time

continues, being oxidized ever further from an edge into the layer stack under the influence of the oxidation gas at the process temperature; recording the process temperature during the processing via a temperature of the holding device which holds the substrate; and controlling the temperature of the substrate to a predetermined desired temperature or a predetermined desired temperature curve during the processing, the holding device, the holding device:

having a flat base body,

having a recess~~(124)~~ which is matched to a substrate~~(114)~~,

~~which holding device~~and includes a recess, which runs in ~~the~~ a circumferential direction of the recess~~(124)~~ for holding the substrate~~(114)~~, for an exchangeable ring~~(128)~~.

16. (Currently Amended) The holding device~~(110)~~ as claimed in claim 15~~and associated rings~~, wherein the holding device~~(110)~~ contains graphite, ~~and wherein there are~~further comprising at least two rings made from different materials~~, preferably one ring which contains silicon and/or one ring which contains silicon carbide and/or one ring which contains quartz and/or one ring which contains gallium arsenide~~.

17. (Currently Amended) The holding device~~(110)~~ as claimed in claim 15, ~~or 16 and associated rings (128), wherein there are~~ further comprising at least two rings of different thickness.